

D E C L A R A T I O N

I, SHINICHI USUI, a Japanese Patent Attorney registered No. 9694, of Okabe International Patent Office at No. 602, Fuji Bldg., 2-3, Marunouchi 3-chome, Chiyoda-ku, Tokyo, Japan, hereby declare that I have a thorough knowledge of Japanese and English languages, and that the attached pages contain a correct translation into English of only the claim part of the priority documents of Japanese Patent Application No. 2002-309786 filed on October 24, 2002 in the name of CANON KABUSHIKI KAISHA.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made, are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed this 14th day of February, 2008

A handwritten signature in black ink, appearing to read 'SHINICHI USUI', written over a horizontal line.

SHINICHI USUI

PATENT OFFICE  
JAPANESE GOVERNMENT

This is to certify that the annexed is a true copy  
of the following application as filed with this office.

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Application Number:      Japanese Patent Application  
                                 No. 2002-309786  
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Applicant(s):              CANON KABUSHIKI KAISHA

November 27, 2003

Commissioner,  
Patent Office              Yasuo IMAI

(Seal)

Certificate No. 2003-3097890

2002-309786

**Applicant's Information**

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(Reason of Change) New Registration

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2002-309786

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[Date] October 24, 2002

[Addressed to] Commissioner of the  
Patent Office

[International Classification] C08G 63/02

[Title of the Invention] NEW POLYHYDROXYALKANOATE  
COMPRISING UNIT HAVING  
(PHENYLEMTHYL) OXY STRUCTURE ON SIDE  
CHAIN, AND METHOD FOR PRODUCING THE  
SAME

[Number of the Claims] 20

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[Indication of Official Fee]

[Prepayment Ledger No.] 011224

[Amount] ¥21000

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[Material] Specification 1

[Material] Drawings 1

[Material] Abstract 1

[General Power of Attorney] 9908388

[Proof requirement] necessary

[Designation of Document] Specification

[Title of the Invention]

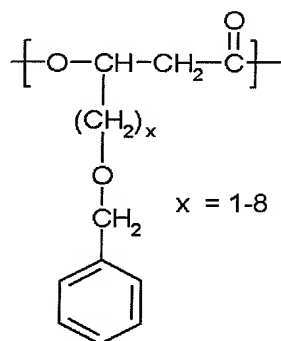
NEW POLYHYDROXYALKANOATE COMPRISING UNIT HAVING  
(PHENYLMETHYL)OXY STRUCTURE ON SIDE CHAIN, AND METHOD  
5 FOR PRODUCING THE SAME

[Claims]

[Claim 1]

A polyhydroxyalkanoate comprising a 3-hydroxy-  
10  $\omega$ -[(phenylmethyl)oxy]alkanoic acid unit represented  
by a chemical formula (1):

[chemical 1]



(1)

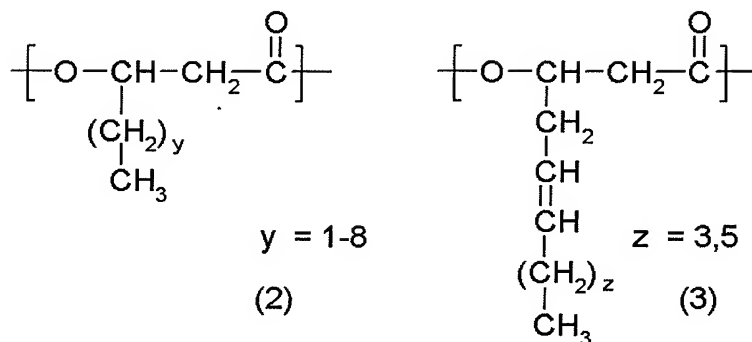
15 (wherein x may assume one or more arbitrary integral  
values within the range shown in the chemical  
formula).

[Claim 2]

20 The polyhydroxyalkanoate according to claim 1,  
comprising, in addition to the unit represented by  
the chemical formula (1), at least one of the units

represented by chemical formulae (2) and (3):

[chemical 2]

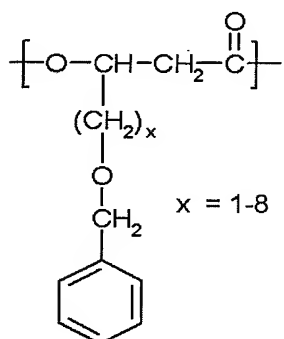


(wherein y and z each may assume one or more  
 5 arbitrary integral values within the range shown in  
 the chemical formula, independently from the unit  
 represented by the chemical formula (1)).

[Claim 3]

10 The polyhydroxyalkanoate according to claim 1  
 or 2, comprising, simultaneously in a molecule  
 thereof, at least the 3-hydroxy- $\omega$ -  
 [(phenylmethyl)oxy]alkanoic acid unit represented by  
 the chemical formula (1):

15 [chemical 3]

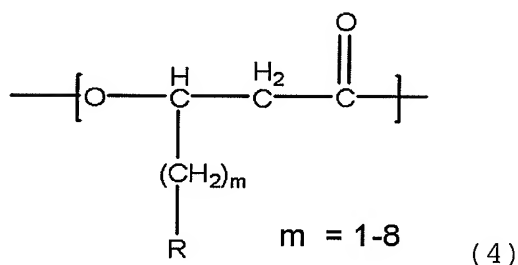


(1)

(wherein x may assume one or more arbitrary integral values within the range shown in the chemical formula);

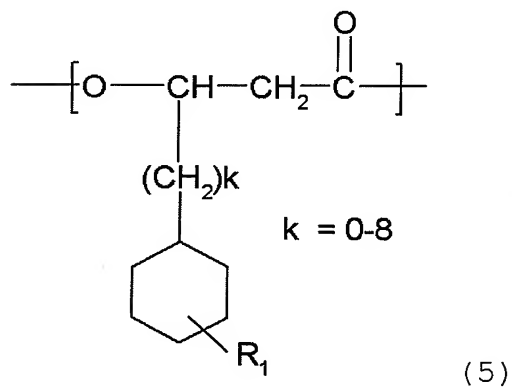
5 and a 3-hydroxy- $\omega$ -cyclohexylalkanoic acid unit represented by a chemical formula (4):

[chemical 4]



(wherein m may assume one or more arbitrary integral values within the range shown in the chemical formula; and R includes a residue having either a phenyl structure or thienyl structure),  
10 or represented by a chemical formula (5):

[chemical 5]



15

(wherein R<sub>1</sub> represents a substituent on a cyclohexyl group and R<sub>1</sub> is a H atom, a CN group, a NO<sub>2</sub> group, a



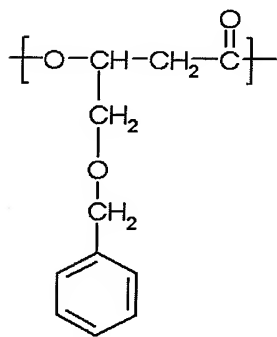
halogen atom, a CH<sub>3</sub> group, a C<sub>2</sub>H<sub>5</sub> group, a C<sub>3</sub>H<sub>7</sub> group, a CF<sub>3</sub> group, a C<sub>2</sub>F<sub>5</sub> group or a C<sub>3</sub>F<sub>7</sub> group, and k may assume one or more arbitrary integral values within the range shown in the chemical formula).

5

[Claim 4]

The polyhydroxyalkanoate according to any one of claims 1 to 3, wherein the 3-hydroxy- $\omega$ -[(phenylmethyl)oxy]alkanoic acid unit represented by  
10 the chemical formula (1) is either one or more of:  
a 3-hydroxy-4-[(phenylmethyl)oxy]butyric acid unit represented by a chemical formula (6):

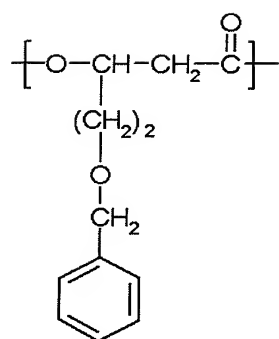
[chemical 6]



(6)

15 and a 3-hydroxy-5-[(phenylmethyl)oxy]valeric acid unit represented by a chemical formula (7):

[chemical 7]

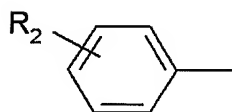


(7)

[Claim 5]

The polyhydroxyalkanoate according to claim 3 or 4, wherein R in the chemical formula (4), namely the residue having a phenyl structure or a thienyl structure belongs to a group of residues represented by a chemical formula (8):

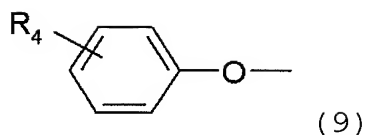
[chemical 8]



(8)

(wherein  $R_2$  indicates a substituent group on the aromatic ring and  $R_2$  represents a H atom, a halogen atom, a CN group, a  $NO_2$  group, a  $CH_3$  group, a  $C_2H_5$  group, a  $C_3H_7$  group, a  $CH=CH_2$  group, a  $COOR_3$  group (wherein  $R_3$  represents any one of a H atom, a Na atom and a K atom), a  $CF_3$  group, a  $C_2F_5$  group or a  $C_3F_7$  group, and in a case where plural units are present,  $R_2$  may be different for each unit); a group of residues represented by a chemical formula (9):

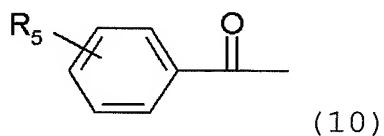
[chemical 9]



(wherein  $R_4$  indicates a substituent group on the aromatic ring and  $R_4$  represents a H atom, a halogen atom, a CN group, a  $NO_2$  group, a  $CH_3$  group, a  $C_2H_5$  group, a  $C_3H_7$  group, a  $SCH_3$  group, a  $CF_3$  group, a  $C_2F_5$  group or a  $C_3F_7$  group, and in a case where plural units are present,  $R_4$  may be different for each unit; a group of residues represented by a chemical formula

10 (10):

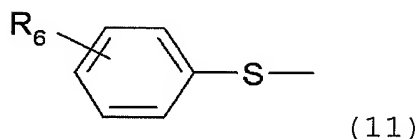
[chemical 10]



(wherein  $R_5$  indicates a substituent group on the aromatic ring and  $R_5$  is a H atom, a halogen atom, a CN group, a  $NO_2$  group, a  $CH_3$  group, a  $C_2H_5$  group, a  $C_3H_7$  group, a  $CF_3$  group, a  $C_2F_5$  group or a  $C_3F_7$  group, and in a case where plural units are present,  $R_5$  may be different for each unit); a group of residues represented by a chemical formula (11):

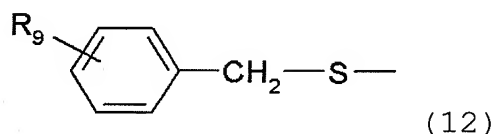
15

20 [chemical 11]



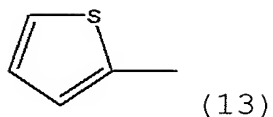
(wherein  $R_6$  indicates a substituent group on the aromatic ring and  $R_6$  represents a H atom, a halogen atom, a CN group, a  $\text{NO}_2$  group, a  $\text{COOR}_7$  group, a  $\text{SO}_2\text{R}_8$  group (wherein  $R_7$  represents any one of H, Na, K,  $\text{CH}_3$  and  $\text{C}_2\text{H}_5$ , and  $R_8$  represents any one of OH, ONa, OK, a halogen atom,  $\text{OCH}_3$  and  $\text{OC}_2\text{H}_5$ ), a  $\text{CH}_3$  group, a  $\text{C}_2\text{H}_5$  group, a  $\text{C}_3\text{H}_7$  group, a  $(\text{CH}_3)_2\text{-CH}$  group, or a  $(\text{CH}_3)_3\text{-C}$  group, and in a case where plural units are present,  $R_6$  may be different for each unit); a group of residues represented by a chemical formula (12):

[chemical 12]



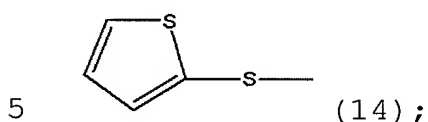
(wherein  $R_9$  represents a substituent group on the aromatic ring, and  $R_9$  represents a H atom, a halogen atom, a CN group, a  $\text{NO}_2$  group, a  $\text{COOR}_{10}$  group, a  $\text{SO}_2\text{R}_{11}$  group (wherein  $\text{R}_{10}$  represents any one of H, Na, K,  $\text{CH}_3$  and  $\text{C}_2\text{H}_5$ , and  $\text{R}_{11}$  represents any one of OH, ONa, OK, a halogen atom,  $\text{OCH}_3$  and  $\text{OC}_2\text{H}_5$ ), a  $\text{CH}_3$  group, a  $\text{C}_2\text{H}_5$  group, a  $\text{C}_3\text{H}_7$  group, a  $(\text{CH}_3)_2\text{-CH}$  group or a  $(\text{CH}_3)_3\text{-C}$  group, and in a case where plural units are present,  $R_9$  may be different for each unit); a group of residues represented by a chemical formula (13):

[chemical 13]



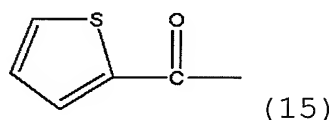
a group of residues represented by a chemical formula (14):

[chemical 14]



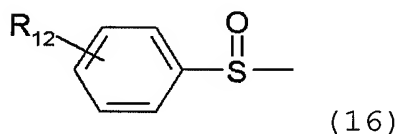
a group of residues represented by a chemical formula (15):

[chemical 15]



10 a group of residues represented by a chemical formula (16):

[chemical 16]

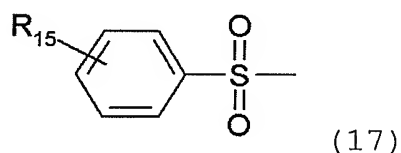


15 (wherein  $R_{12}$  indicates a substituent group on the aromatic ring and  $R_{12}$  represents any one of a H atom, a halogen atom, a CN group, a  $NO_2$  group, a  $COOR_{13}$  group, a  $SO_2R_{14}$  group (wherein  $R_{13}$  represents any one of H, Na, K,  $CH_3$  and  $C_2H_5$ , and  $R_{14}$  represents any one of OH, ONa, OK, a halogen atom,  $OCH_3$  and  $OC_2H_5$ ), a  $CH_3$

group, a  $C_2H_5$  group, a  $C_3H_7$  group, a  $(CH_3)_2-CH$  group and  $(CH_3)_3-C$  group, and in a case where plural units are present,  $R_{12}$  may be different for each unit); a group of residues represented by a chemical formula

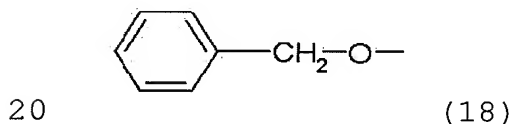
5 (17):

[chemical 17]



(wherein  $R_{15}$  indicates a substituent group on the aromatic ring and  $R_{15}$  is any one of a H atom, a  
10 halogen atom, a CN group, a  $NO_2$  group, a  $COOR_{16}$  group, a  $SO_2R_{17}$  group (wherein  $R_{16}$  represents any one of H, Na, K,  $CH_3$  and  $C_2H_5$ , and  $R_{17}$  represents any one of OH, ONa, OK, a halogen atom,  $OCH_3$  and  $OC_2H_5$ ), a  $CH_3$  group, a  $C_2H_5$  group, a  $C_3H_7$  group, a  $(CH_3)_2-CH$  group and a  
15  $(CH_3)_3-C$  group, and in a case where plural units are present,  $R_{15}$  may be different for each unit); and a group of residues represented by a chemical formula (18):

[chemical 18]



[Claim 6]

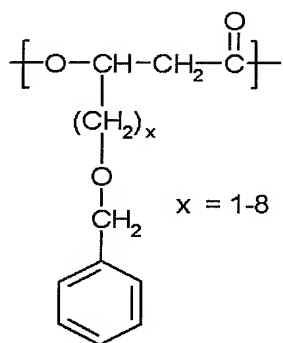
The polyhydroxyalkanoate according to any one

of claims 1 to 5, wherein a number-average molecular weight is within a range from 1,000 to 1,000,000.

[Claim 7]

- 5 A method for producing a polyhydroxyalkanoate containing, in a molecule thereof, a 3-hydroxy- $\omega$ -[(phenylmethyl)oxy]alkanoic acid unit represented by a chemical formula (1):

[chemical 21]

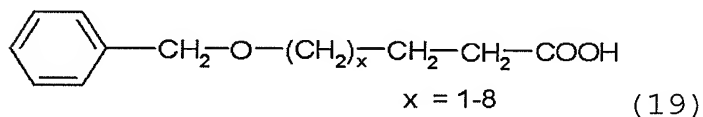


10

(1)

- (wherein x may assume one or more arbitrary integral values within the range shown in the chemical formula), which comprises allowing, under a condition containing  $\omega$ -[(phenylmethyl)oxy]alkanoic acid
- 15 represented by a chemical formula (19):

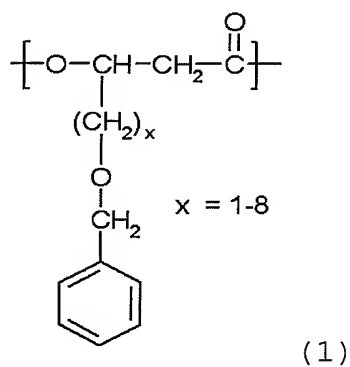
[chemical 19]



(wherein x may assume one or more arbitrary integral values within the range shown in the chemical

formula), a microorganism having an ability to produce a polyhydroxyalkanoate containing in a molecule thereof a 3-hydroxy- $\omega$ -[(phenylmethyl)oxy]alkanoic acid unit of the chemical  
 5 formula (1):

[chemical 20]

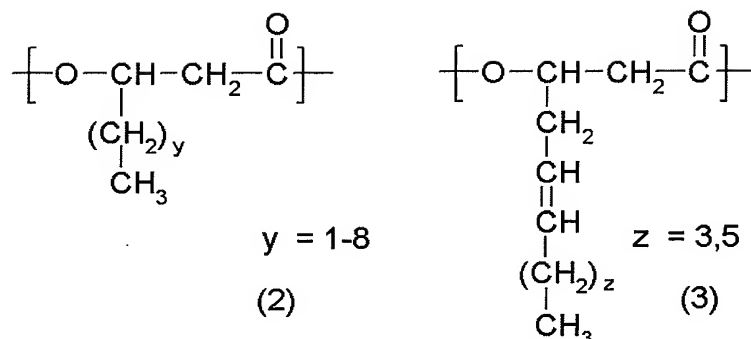


to execute biosynthesis.

10 [Claim 8]

The method for producing a polyhydroxyalkanoate according to claim 7, wherein polyhydroxyalkanoate contains, in addition to the unit represented by the chemical formula (1), at least one of the units  
 15 represented by chemical formulae (2) and (3):  
 [chemical 22]



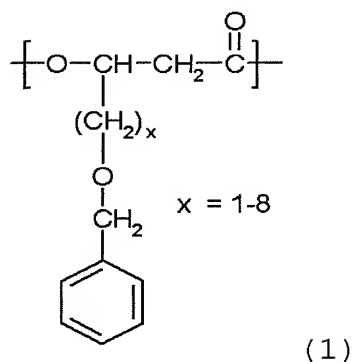


(wherein y and z each may assume one or more arbitrary integral values within the range shown in the chemical formulae, independently from the unit  
 5 represented by the chemical formula (1)).

[Claim 9]

The producing method according to claim 7 or 8 for producing a polyhydroxyalkanoate containing,  
 10 within a molecule at the same time, a 3-hydroxy- $\omega$ -[(phenylmethyl)oxy] alkanolic acid unit represented by a chemical formula (1):

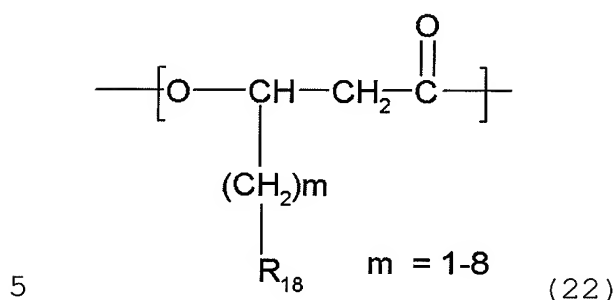
[chemical 29]



15 (wherein x may assume one or more arbitrary integral

values within the range shown in the chemical formula), and a 3-hydroxy- $\omega$ -cyclohexylalkanoic acid unit represented by a chemical formula (22):

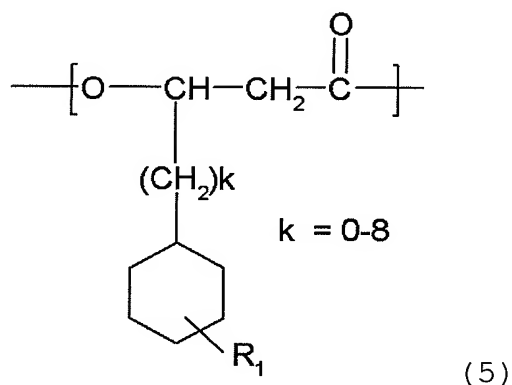
[chemical 30]



(wherein m may assume one or more arbitrary integral values within the range shown in the chemical formula; and R<sub>18</sub> includes a residue having either a phenyl structure or thienyl structure),

or represented by a chemical formula (5):

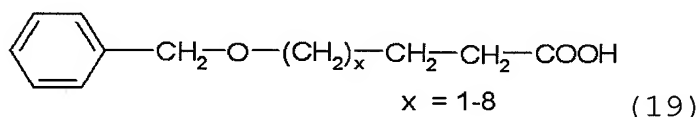
[chemical 31]



(wherein R<sub>1</sub> represents a substituent on a cyclohexyl group and R<sub>1</sub> is a H atom, a CN group, a NO<sub>2</sub> group, a halogen atom, a CH<sub>3</sub> group, a C<sub>2</sub>H<sub>5</sub> group, a C<sub>3</sub>H<sub>7</sub> group, a CF<sub>3</sub> group, a C<sub>2</sub>F<sub>5</sub> group or a C<sub>3</sub>F<sub>7</sub> group, and k may

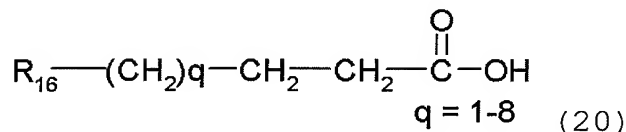
assume one or more arbitrary integral values within the range shown in the chemical formula), the method comprising, under a condition containing ω-[(phenylmethyl)oxy]alkanoic acid represented by a  
5 chemical formula (19):

[chemical 23]



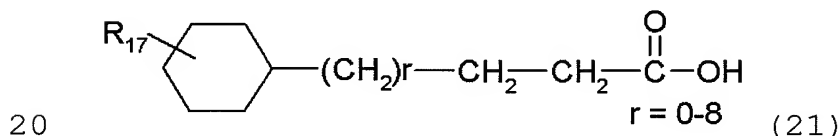
(wherein x may assume one or more arbitrary integral values within the range shown in the chemical  
10 formula) and ω-cyclohexylalkanoic acid represented by a chemical formula (20)

[chemical 24]



(wherein q may assume one or more arbitrary integral  
15 values within the range shown in the chemical formula; and R<sub>16</sub> includes a residue having either a phenyl structure or thienyl structure), or represented by:

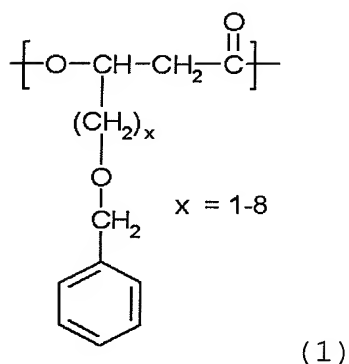
[chemical 25]



(wherein R<sub>17</sub> represents a substituent on a cyclohexyl

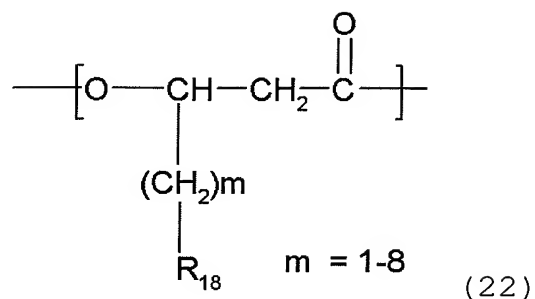
group and R<sub>17</sub> is a H atom, a CN group, a NO<sub>2</sub> group, a halogen atom, a CH<sub>3</sub> group, a C<sub>2</sub>H<sub>5</sub> group, a C<sub>3</sub>H<sub>7</sub> group, a CF<sub>3</sub> group, a C<sub>2</sub>F<sub>5</sub> group or a C<sub>3</sub>F<sub>7</sub> group, and r may assume one or more arbitrary integral values within the range shown in the chemical formula), utilizing ω-[(phenylmethyl)oxy] alkanolic acid represented by the chemical formula (19) and the compound represented by the chemical formula (20) or ω-cyclohexylalkanoic acid represented by the chemical formula (21) as the raw material and executing a biosynthesis by a microorganism having an ability to produce a polyhydroxyalkanoate including, in a molecule thereof at the same time, a 3-hydroxy-ω-[(phenylmethyl)oxy] alkanolic acid unit represented by the chemical formula (1):

[chemical 26]



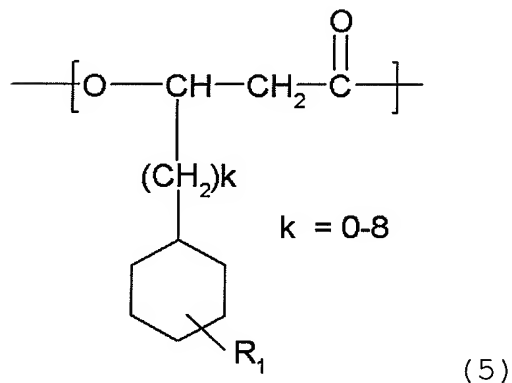
(wherein x may assume one or more arbitrary integral values within the range shown in the chemical formula) and a 3-hydroxy-ω-cyclohexylalkanoic acid unit represented by a chemical formula (22)

[chemical 27]



(wherein m may assume one or more arbitrary integral values within the range shown in the chemical formula; and R<sub>18</sub> includes a residue having either a phenyl structure or thienyl structure), or represented by a chemical formula (5):

[chemical 28]

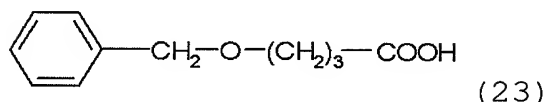


10 (wherein R<sub>1</sub> represents a substituent on a cyclohexyl group and R<sub>1</sub> is a H atom, a CN group, a NO<sub>2</sub> group, a halogen atom, a CH<sub>3</sub> group, a C<sub>2</sub>H<sub>5</sub> group, a C<sub>3</sub>H<sub>7</sub> group, a CF<sub>3</sub> group, a C<sub>2</sub>F<sub>5</sub> group or a C<sub>3</sub>F<sub>7</sub> group, and k may assume one or more arbitrary integral values within  
15 the range shown in the chemical formula).

[Claim 10]

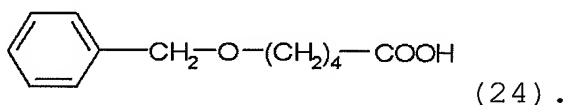
The method for producing a polyhydroxyalkanoate according to any one of claims 7 to 9, wherein the ω-[(phenylmethyl)oxy]alkanoic acid represented by said  
5 chemical formula (19) is 4-[(phenylmethyl)oxy]butyric acid represented by a chemical formula (23):

[chemical 32]



or 5-[(phenylmethyl)oxy]valeric acid represented by a  
10 chemical formula (24):

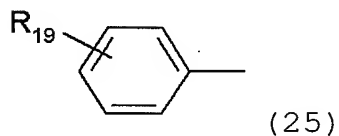
[chemical 33]



[Claim 11]

15 The method for producing a polyhydroxyalkanoate according to claim 9 or 10, wherein  $R_{16}$  in the chemical formula (20) and  $R_{18}$  in the chemical formula (22), namely the residues having a phenyl structure or a thienyl structure, belong to a group of residues  
20 represented by a chemical formula (25):

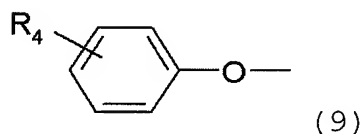
[chemical 34]



(wherein  $R_{19}$  indicates a substituent group on the

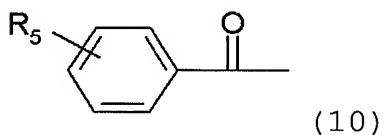
aromatic ring and  $R_{19}$  represents a H atom, a halogen atom, a CN group, a  $\text{NO}_2$  group, a  $\text{CH}_3$  group, a  $\text{C}_2\text{H}_5$  group, a  $\text{C}_3\text{H}_7$  group, a  $\text{CH}=\text{CH}_2$  group, a  $\text{CF}_3$  group, a  $\text{C}_2\text{F}_5$  group or a  $\text{C}_3\text{F}_7$  group, and in a case where plural  
 5 units are present,  $R_{19}$  may be different for each unit); a group of residues represented by a chemical formula (9):

[chemical 35]



10 (wherein  $R_4$  indicates a substituent group on the aromatic ring and  $R_4$  represents a H atom, a halogen atom, a CN group, a  $\text{NO}_2$  group, a  $\text{CH}_3$  group, a  $\text{C}_2\text{H}_5$  group, a  $\text{C}_3\text{H}_7$  group, a  $\text{SCH}_3$  group, a  $\text{CF}_3$  group, a  $\text{C}_2\text{F}_5$  group or a  $\text{C}_3\text{F}_7$  group, and in a case where plural  
 15 units are present,  $R_4$  may be different for each unit); a group of residues represented by a chemical formula (10):

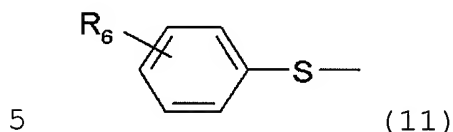
[chemical 36]



20 (wherein  $R_5$  indicates a substituent group on the aromatic ring and  $R_5$  is a H atom, a halogen atom, a CN group, a  $\text{NO}_2$  group, a  $\text{CH}_3$  group, a  $\text{C}_2\text{H}_5$  group, a  $\text{C}_3\text{H}_7$  group, a  $\text{CF}_3$  group, a  $\text{C}_2\text{F}_5$  group or a  $\text{C}_3\text{F}_7$  group,

and in a case where plural units are present,  $R_5$  may be different for each unit); a group of residues represented by a chemical formula (11):

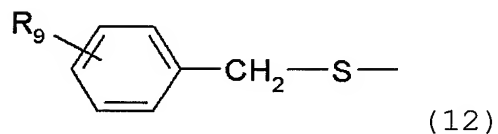
[chemical 37]



(wherein  $R_6$  indicates a substituent group on the aromatic ring and  $R_6$  represents a H atom, a halogen atom, a CN group, a  $\text{NO}_2$  group, a  $\text{COOR}_7$  group, a  $\text{SO}_2\text{R}_8$  group (wherein  $R_7$  represents any one of H, Na, K,  $\text{CH}_3$  and  $\text{C}_2\text{H}_5$ , and  $R_8$  represents any one of OH, ONa, OK, a halogen atom,  $\text{OCH}_3$  and  $\text{OC}_2\text{H}_5$ ), a  $\text{CH}_3$  group, a  $\text{C}_2\text{H}_5$  group, a  $\text{C}_3\text{H}_7$  group, a  $(\text{CH}_3)_2\text{-CH}$  group, or a  $(\text{CH}_3)_3\text{-C}$  group, and in a case where plural units are present,  $R_6$  may be different for each unit); a group of residues represented by a chemical formula (12):

10  
15

[chemical 38]



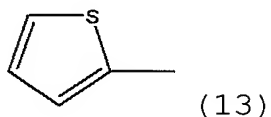
(wherein  $R_9$  represents a substituent group on the aromatic ring, and  $R_9$  represents a H atom, a halogen atom, a CN group, a  $\text{NO}_2$  group, a  $\text{COOR}_{10}$  group, a  $\text{SO}_2\text{R}_{11}$  group (wherein  $R_{10}$  represents any one of H, Na, K,  $\text{CH}_3$  and  $\text{C}_2\text{H}_5$ , and  $R_{11}$  represents any one of OH, ONa, OK, a halogen atom,  $\text{OCH}_3$  and  $\text{OC}_2\text{H}_5$ ), a  $\text{CH}_3$  group, a  $\text{C}_2\text{H}_5$

20



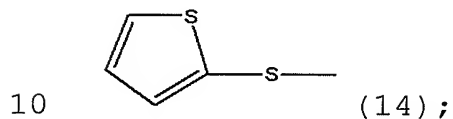
group, a  $C_3H_7$  group, a  $(CH_3)_2-CH$  group or a  $(CH_3)_3-C$  group, and in a case where plural units are present,  $R_9$  may be different for each unit); a group of residues represented by a chemical formula (13):

5 [chemical 39]



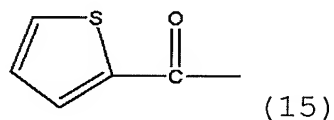
a group of residues represented by a chemical formula (14):

[chemical 40]



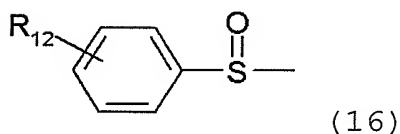
a group of residues represented by a chemical formula (15):

[chemical 41]



15 a group of residues represented by a chemical formula (16):

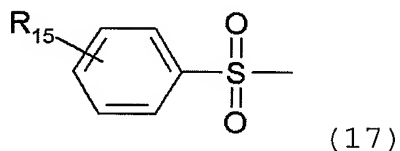
[chemical 42]



(wherein  $R_{12}$  indicates a substituent group on the

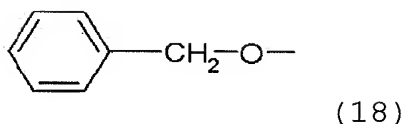
aromatic ring and  $R_{12}$  represents any one of a H atom, a halogen atom, a CN group, a  $\text{NO}_2$  group, a  $\text{COOR}_{13}$  group, a  $\text{SO}_2\text{R}_{14}$  group (wherein  $R_{13}$  represents any one of H, Na, K,  $\text{CH}_3$  and  $\text{C}_2\text{H}_5$ , and  $R_{14}$  represents any one of OH, ONa, OK, a halogen atom,  $\text{OCH}_3$  and  $\text{OC}_2\text{H}_5$ ), a  $\text{CH}_3$  group, a  $\text{C}_2\text{H}_5$  group, a  $\text{C}_3\text{H}_7$  group, a  $(\text{CH}_3)_2\text{-CH}$  group and  $(\text{CH}_3)_3\text{-C}$  group, and in a case where plural units are present,  $R_{12}$  may be different for each unit); a group of residues represented by a chemical formula (17):

[chemical 43]



(wherein  $R_{15}$  indicates a substituent group on the aromatic ring and  $R_{15}$  is any one of a H atom, a halogen atom, a CN group, a  $\text{NO}_2$  group, a  $\text{COOR}_{16}$  group, a  $\text{SO}_2\text{R}_{17}$  group (wherein  $R_{16}$  represents any one of H, Na, K,  $\text{CH}_3$  and  $\text{C}_2\text{H}_5$ , and  $R_{17}$  represents any one of OH, ONa, OK, a halogen atom,  $\text{OCH}_3$  and  $\text{OC}_2\text{H}_5$ ), a  $\text{CH}_3$  group, a  $\text{C}_2\text{H}_5$  group, a  $\text{C}_3\text{H}_7$  group, a  $(\text{CH}_3)_2\text{-CH}$  group and a  $(\text{CH}_3)_3\text{-C}$  group, and in a case where plural units are present,  $R_{15}$  may be different for each unit); and a group of residues represented by a chemical formula (18):

[chemical 44]



[Claim 12]

The method for producing a polyhydroxyalkanoate  
5 according to any one of claims 7 to 11, wherein the  
microorganism is cultured in a medium containing the  
ω-[(phenylmethyl)oxy]alkanoic acid represented by  
chemical formula (19).

10 [Claim 13]

The method for producing a polyhydroxyalkanoate  
according to any one of claims 9 to 11, wherein the  
microorganism is cultured in a medium containing the  
ω-[(phenylmethyl)oxy]alkanoic acid represented by  
15 chemical formula (19) and the compound represented by  
the chemical formula (20) or the ω-cyclohexylalkanoic  
acid represented by chemical formula (21).

[Claim 14]

20 The method for producing a polyhydroxyalkanoate  
according to claim 12 or 13, wherein the  
microorganism is cultured in a medium containing, in  
addition to ω-[(phenylmethyl)oxy]alkanoic acid  
represented by chemical formula (19), at least one of  
25 peptides, yeast extracts, organic acids or salts

thereof, amino acids or salts thereof, saccharides and straight-chain alkanolic acids containing 4 to 12 carbon atoms or salts thereof.

5 [Claim 15]

The method for producing a polyhydroxyalkanoate according to claim 14, wherein the peptide contained in the culture medium is polypeptone; the organic acids contained in the culture medium or salts  
10 thereof are one or more compounds selected from the group consisting of pyruvic acid, oxaloacetic acid, citric acid, isocitric acid, ketoglutaric acid, succinic acid, fumaric acid, malic acid, lactic acid, and salts thereof; the amino acids or salts thereof  
15 are one or more compounds selected from the group consisting of glutamic acid, aspartic acid, and salts thereof; and the saccharides contained in the culture medium are one or more compounds selected from the group consisting of glyceroaldehyde, erythrose,  
20 arabinose, xylose, glucose, galactose, mannose, fructose, glycerol, erythritol, xylitol, gluconic acid, glucronic acid and galacturonic acid, maltose, sucrose and lactose.

25 [Claim 16]

The method for producing a polyhydroxyalkanoate according to any one of claims 12 to 15, wherein said

culture of microorganisms comprises two or more culturing steps.

[Claim 17]

5           The method for producing a polyhydroxyalkanoate according to claim 16, wherein said culture is a fed-batch culture.

[Claim 18]

10           The method for producing a polyhydroxyalkanoate according to any one of claims 12 to 17, comprising a step of culturing the microorganism in a medium containing  $\omega$ -[(phenylmethyl)oxy]alkanoic acid represented by chemical formula (19) and recovering  
15 polyhydroxyalkanoate containing 3-hydroxy- $\omega$ -[(phenylmethyl)oxy]alkanoic acid unit represented by the chemical formula (1) generated by the microorganism from the cells of the microorganism.

20 [Claim 19]

          The method for producing a polyhydroxyalkanoate according to any one of claims 7 to 18, wherein the microorganism belongs to *Pseudomonas* species.

25 [Claim 20]

          The method for producing a polyhydroxyalkanoate according to claim 19, wherein the microorganism is

one or more strains selected from the group consisting of *Pseudomonas cichorii* YN2 (FERM BP-7375), *Pseudomonas cichorii* H45 (FERM BP-7374) and *Pseudomonas jessenii* P161 (FERM BP-7376).